

Weekly Report

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2017.09.04 - 2017.09.10

Happy Teacher's Day!

Projects

Revising A Paper from Visual Informatics

The comment has been submitted.

Courseware for the Graduated Students

The revised version has been sent back.

Deep Learning on Trajectory Data

- **Matrix Reordering** Ren Yi has found a library for performing reordering of the adjacency matrices. Figure 1 shows the reordering result. Tomorrow (Monday) we will discuss the reordering results.

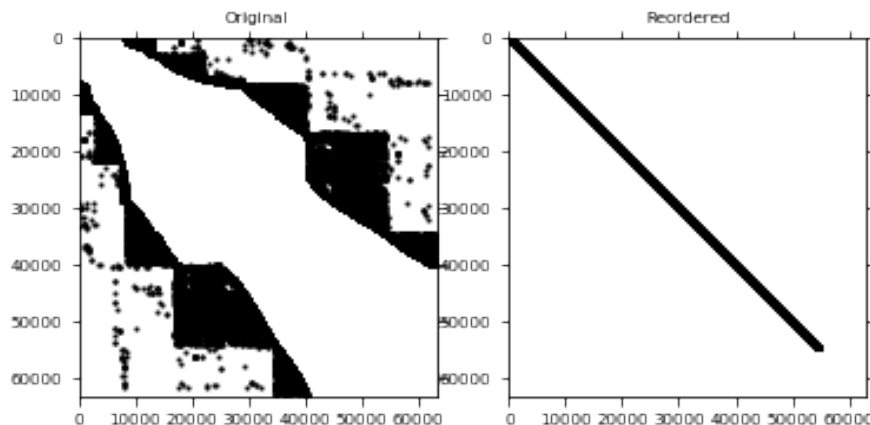


Figure 1: The reordering result of the flow matrix. All the crossings in the dataset are included.

- **Preliminary Survey on Deep Learning and Trajectory Data** Currently, we changed our idea from flow fields to network flows. For the communities of intelligent transportation system and machine learning, there are several tasks that they mainly consider (as far as I know in this week):

1. Travel time prediction [1];
2. Congestion estimation [2, 3].

For the two tasks, the network flows are considered as a time-series prediction problem:

For each node, given a time series of inflows and outflows, a model is required to predict the future series of the flows.

Transferred into the form of adjacency matrices, the problem is to predict **the future series of the adjacency matrices**. Commonly-used models include RNN and LSTM. For us, the next step is to define where visualization is necessary to be involved in the process. A potential direction is to follow the mode of predictive visual analysis and utilize visualization to explore the input data, model building processes and prediction results.

Table 1: Plan for the Next Week

Target Date	Project	Progress	Problems
09.07	Review of a Visual Informatics paper	Submitted.	
09.10	Courseware for graduated students	Revised and sent back to Xumeng.	
09.17	DeepVis paper review	The response letter is almost finished.	Reviewer 2's questions are too difficult to find ways to answer. Still figuring out.
10.20	PhD Thesis	<ul style="list-style-type: none"> • Templates are ready. • Read Zhu Biao and Xia Jing's PhD thesis. • The SVM paper and transfer learning paper is migrating to the template. 	Framework. It seems that the MobilityViewer is somewhat difficult to organize.
12.30	Deep learning and trajectories		

References

- [1] Yanjie Duan, Yisheng Lv, and Fei-Yue Wang, "Travel time prediction with LSTM neural network," *2016 IEEE 19th International Conference on Intelligent Transportation Systems (ITSC)*, no. November, pp. 1053–1058, 2016.
- [2] M. Fouladgar, M. Parchami, R. Elmasri, and A. Ghaderi, "Scalable Deep Traffic Flow Neural Networks for Urban Traffic Congestion Prediction," 2017.
- [3] H. Yu, Z. Wu, S. Wang, Y. Wang, and X. Ma, "Spatiotemporal recurrent convolutional networks for traffic prediction in transportation networks," *Sensors (Switzerland)*, vol. 17, no. 7, pp. 1–16, 2017.